The Decline of Jupiter's M-cm Synchrotron Radio Emission During the Year Following the SL-9 Impacts

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Measurements of Jupiter's microwave radio emission from 1990 through August 1995 are reported and analyzed to study the rate of decay in the synchrotron radiation following the dramatic increase observed in July 1994 during the week of impacts by fragments of Comet Shoemaker-Levy 9. The observations were made at 2295 MHz as part of the NASA-JPL Jupiter Patrol, a long-term radio astronomy monitoring program begun in 1971. Data from 34-meter and 70-meter antennas at the NASA's Deep Space Communication Complex at Goldstone, CA are used to estimate slope and curvature of plausible "baselines" for Jupiter's non-thermal flux density over the five-year interval. These "baseline" estimates are then used to derive decay times for the outburst emission related to the SL-9 impacts.

The measurements show that Jupiter's flux density, normalized to 4.04 au, was declining approximately 8 percent-per-year from 1990 through 1993. Based on previous history, it is unlikely that a monotonic decline would be sustained for as long as six years (1990-1995) so the baseline and the decay rate can only be estimated, Typical exponential decay times (l/e) at 2295 MHz are in the range 75-150 days.

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